

Application No. 10/621,595

Reply to Office Action of Dec. 01, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A system for detecting neutron radiation comprising:

a liquid cocktail mixture comprised of a neutron absorber dissolved in water with a liquid scintillator, the neutron absorber component selected from the group consisting of LiBF_4 (lithium tetrafluoroborate), LiCl (lithium chloride) and NaBF_4 (sodium tetrafluoroborate), said cocktail mixture housed in a tube having a mirror at one end of the tube and a windowed portal at the other end of the tube such that neutrons that penetrate the tube react with the neutron absorber producing ionization that excites the scintillator and produces photons;

a photo-multiplier tube coupled with the windowed portal for receiving the photons and converting the photons to electrical signals; and

a processing device for receiving and analyzing the electrical signals so as to provide a measurement pertaining to the presence and relative strength of neutron radiation,

wherein the liquid cocktail mixture further comprises a rare earth chelate wavelength shifter for converting light emitted by the scintillator to another wavelength.

Claim 2 (canceled)

Claim 3 (currently amended): The system of claim 2 1 wherein the tube is a polytetrafluoroethylene (PTFE) tube acting as a liquid light guide, the liquid light guide capable of monitoring large apertured areas.

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Claim 4 (currently amended): The system of claim 2 1 wherein the tube is a polytetrafluoroethylene (PTFE) tube modified for portable use as a survey instrument, the tube capable of being easily transported to areas of interest.

Claim 5 (original): The system of claim 1 wherein the neutron absorber component of the cocktail mixture is comprised of LiBF_4 (lithium tetrafluoroborate).

Claim 6 (original): The system of claim 1 wherein the neutron absorber component of the cocktail mixture is comprised of LiCl (lithium chloride).

Claim 7 (original): The system of claim 1 wherein the neutron absorber component of the cocktail mixture is comprised of NaBF_4 (sodium tetrafluoroborate).

Claim 8 (original): The system of claim 1 wherein the scintillator component of the cocktail mixture is comprised of a tris complex of 2,6-pyridine dicarboxylic acid (dipicolinic acid) $\text{Li}_3[\text{Eu}(\text{DPA})_3]$.

Claim 9 (canceled)

Claim 10 (currently amended): The system of claim 9 1 wherein the rare earth chelate is europium.

Claim 11 (currently amended): A liquid cocktail mixture for detecting the presence of neutrons comprising:

a neutron absorber component dissolved in water, the neutron absorber component selected from the group consisting of LiBF_4 (lithium tetrafluoroborate), LiCl (lithium chloride) and NaBF_4 (sodium tetrafluoroborate); and

a liquid scintillator component; and

a rare earth chelate wavelength shifter for converting light produced by the scintillator component to another wavelength.

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Claim 12 (canceled)

Claim 13 (original): The liquid cocktail mixture of claim 11 wherein the neutron absorber component of the cocktail mixture is comprised of LiBF_4 (lithium tetrafluoroborate).

Claim 14 (original): The liquid cocktail mixture of claim 11 wherein the neutron absorber component of the cocktail mixture is comprised of LiCl (lithium chloride).

Claim 15 (original): The liquid cocktail mixture of claim 11 wherein the neutron absorber component of the cocktail mixture is comprised of NaBF_4 (sodium tetrafluoroborate).

Claim 16 (original): The liquid cocktail mixture of claim 11 wherein the scintillator component of the cocktail mixture is comprised of a tris complex of 2,6-pyridine dicarboxylic acid (dipicolinic acid) $\text{Li}_3[\text{Eu}(\text{DPA})_3]$.

Claim 17 (canceled)

Claim 18 (currently amended): The liquid cocktail mixture of claim 11 wherein the rare earth chelate is europium.

Claim 19 (new): The liquid cocktail mixture of claim 1 wherein the liquid scintillator produces blue light and the rare earth chelate wavelength shifter converts the blue light to red light detectable by the photomultiplier tube.

Claim 20 (new): The liquid cocktail mixture of claim 8 wherein the liquid scintillator produces blue light and the rare earth chelate wavelength shifter converts the blue light to red light detectable by the photomultiplier tube.

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Claim 21 (new): The liquid cocktail mixture of claim 11 wherein the liquid scintillator produces blue light and the rare earth chelate wavelength shifter converts the blue light to red light.

Claim 22 (new): The liquid cocktail mixture of claim 16 wherein the liquid scintillator produces blue light and the rare earth chelate wavelength shifter converts the blue light to red light.